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Mazdoor Kisan Shakti Sangathan

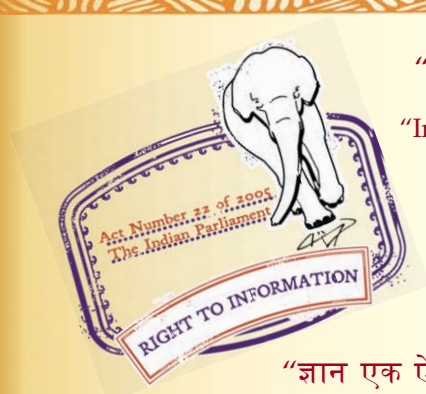
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“Step Out From the Old to the New”

IS 5528 (1985): Method of testing corrosion resistance of electroplated and anodized aluminium coating by copper accelerated acetic acid salt spray (CASS) test [MTD 7: Light Metals and their Alloys]



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“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

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IS : 5520 - 1985

(Reaffirmed 2006)

Indian Standard

METHOD OF
TESTING CORROSION RESISTANCE OF
ELECTROPLATED AND ANODIZED ALUMINIUM
COATING BY COPPER ACCELERATED ACETIC
ACID SALT SPRAY (CASS) TEST

(First Revision)

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INDIAN STANDARDS INSTITUTION
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Indian Standard

METHOD OF TESTING CORROSION RESISTANCE OF ELECTROPLATED AND ANODIZED ALUMINIUM COATING BY COPPER ACCELERATED ACETIC ACID SALT SPRAY (CASS) TEST

(*First Revision*)

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Indian Standard

METHOD OF TESTING CORROSION RESISTANCE OF ELECTROPLATED AND ANODIZED ALUMINIUM COATING BY COPPER ACCELERATED ACETIC ACID SALT SPRAY (CASS) TEST

(First Revision)

0. FOREWORD

0.1 This Indian Standard (First Revision) was adopted by the Indian Standards Institution on 15 February 1985, after the draft finalized by the Metallic and Non-Metallic Coatings Sectional Committee had been approved by the Structural and Metals Division Council.

0.2 This standard was first published in 1969. The present revision has been found necessary in view of the developments in the field of electroplating, testing of corrosion resistance and international standardization.

0.2.1 In this revision, the scope has been extended to metallic and related coatings including decorative copper+nickel+chromium and nickel+chromium electroplated coatings on various bases, designed for relatively severe service.

0.2.2 In this revision, the construction of the spray-cabinet recommended earlier in Appendix A has now been incorporated in a separate specification (*under preparation*) wherein a common recommendation for the apparatus is expected to satisfy the requirements of different salt spray tests, namely, the neutral (NSS), the acetic acid (ASS) and the copper accelerated acetic acid (CASS). Specified tests, exposure duration and evaluation of corrosion resistance test stipulated in relevant Indian Standard have also been incorporated in Appendix B.

0.3 The requirements regarding the corrosion resistance of electroplated, anodic and other coatings or products have been specified in the relevant Indian Standards. Comprehensive accelerated corrosion tests are used to obtain a rating of the behaviour of these coatings to enable correlate with service exposures as far as possible and in a short duration.

0.3.1 The reliability, reproducibility and accuracy of the CASS test depends on proper and consistent control of a number of factors, including:

- a) cleaning of the test specimens, and
- b) positioning of the specimens and samples in the spray-cabinet.

0.3.2 There is seldom a direct relation between resistance to the action of the test solution spray and resistance to corrosion in other media, because several factors influencing the progress of corrosion, such as the formation of protective films, vary greatly with the conditions encountered. Therefore, the results obtained in the test should not be regarded as a direct guide to the corrosion resistance of the tested coatings in all environments where these coatings may be used. Also, performance of different coatings in the test should not be taken as a direct guide to the relative corrosion resistance of these coatings in service.

0.4 While preparing this revision, necessary assistance has been derived from ISO 3770-1976 (E) Metallic coatings — Copper-accelerated acetic acid salt spray test (CASS test), published by the International Organization for Standardization.

0.5 In reporting the results of a test or analysis made in accordance with this standard, if the final value, observed or calculated is to be rounded off, it shall be done in accordance with IS : 2-1960*.

1. SCOPE

1.1 This standard specifies the reagents, the procedure to be used and prescribes conditions for conducting the copper accelerated acetic acid salt spray (CASS) test for assessment of the quality, by way of corrosion resistance of metallic and related coatings applied in accordance with the requirements of the respective coating or product specifications.

1.2 This test was devised for assessing the quality of decorative coatings of copper + nickel + chromium or nickel + chromium; it has been also found suitable for testing anodic oxide coatings of 5 micrometres and above on aluminium. The test should be used only for testing such coatings, unless otherwise specified. This test is not reliable for comparing copper + nickel + chromium coatings with nickel + chromium coatings, because the accelerating effect of copper corrosion products from copper + nickel + chromium coatings is marked by the copper ions present in the test solution.

*Rules for rounding off numerical values (*revised*).

1.2.1 The suitability of this test and the correlation of the results with service exposures should be determined before it is specified for coatings other than those mentioned earlier.

1.3 This standard does not specify the type of test specimen, the exposure period for a particular coating or product, or the interpretation of results. Such details are given in the appropriate coating or product specifications.

2. TEST SOLUTION

2.1 The test solution shall be prepared by dissolving sodium chloride in distilled or de-ionized water (*see Note*) to produce a concentration of 50 ± 5 g/l. The sodium chloride (NaCl) shall be white and shall give a colourless solution in water. It shall be substantially free from copper and nickel and shall not contain sodium iodide more than 0.1 percent and not more than 0.4 percent of total impurities, calculated for dry salt (*see Note*). If the pH of the solution so prepared is outside the range of 6.0 to 7.0, the presence of undesirable impurities in the salt or the water or both should be suspected and investigated.

NOTE — The distilled water shall be as per IS : 1070-1977* NaCl , $\text{CuCl}_2 \cdot 2\text{H}_2\text{O}$ and CH_3COOH shall be of AR quality.

2.2 A sufficient quantity of cupric chloride dihydrate ($\text{CuCl}_2 \cdot 2\text{H}_2\text{O}$), (*see Note*) shall be dissolved in the salt solution (conforming to 2.1) to prepare a concentration of 0.26 ± 0.02 g/l (equal to 0.205 ± 0.015 g/l (CuCl_2)).

NOTE — The distilled water shall be as per IS : 1070-1977* NaCl , $\text{CuCl}_2 \cdot 2\text{H}_2\text{O}$ and CH_3COOH shall be of AR quality.

2.3 A sufficient quantity of glacial acetic acid (CH_3COOH) (*see Note*) shall be added to the test solution (conforming to 2.2) to ensure that the pH of samples of sprayed solution collected in the spray-cabinet may be between 3.1 and 3.3. If the pH of the sprayed solution condensate is likely to be within the specified limits as per 6.2. All pH values shall be measured electro-metrically at 25°C but a short range pH paper which can be read in increments of 0.1 pH unit or less and which has been calibrated against electrometric measurements may be used in routine checks. Any necessary correction shall be made by additions of solutions of glacial acetic acid or sodium hydroxide of analytical grade.

NOTE — The distilled water shall be as per IS : 1070-1977* NaCl , $\text{CuCl}_2 \cdot 2\text{H}_2\text{O}$ and CH_3COOH shall be of AR quality.

(Generally, if less than 5.0 or more than 6.0 ml of glacial acetic acid is required per 3.8 litres of the $\text{NaCl} + \text{CuCl}_2 \cdot 2\text{H}_2\text{O}$ solution to

*Specification for water for general laboratory use (second revision).

attain the specified pH, the purity of the water or salt or both, general cleanliness of the system, accuracy of the pH-meter, etc, may not be satisfactory.)

2.4 The test solution so prepared shall be filtered before it is placed in the reservoir of the apparatus, in order to remove any solid matter which might block the apertures of the spraying devices.

NOTE.— The distilled water shall be as per IS : 1070-1977* NaCl, CuCl₂·2H₂O and CH₃COOCH shall be of AR quality.

3. APPARATUS

3.1 The spray-cabinet shall be of minimum 0.4 m³ capacity, made of or lined with material resistant to corrosion by the sprayed solution and so shaped as not to allow the condensate to fall on the test specimens, having facility to maintain the inside temperature in the spray cabinet as per 6.1 and provided with one or more atomizers made of material inert to the spray of the test solution. The test solution shall be contained in a reservoir capable of maintaining a constant level of the test solution and made of material resistant to corrosion by the test solution, and shall be sprayed through such atomizers with the help of duly filtered and adequately humidified compressed air supplied at a pressure of 70 to 170 kPa.

3.2 The size and shape of the spray cabinet, compressed air pressure, appropriate temperature, type of atomizer nozzle and the overall arrangement of the system shall be so selected as to obtain the rate of collection and the values of the condensate solution, collected in at least two collecting devices of 80 cm² horizontal collecting area for each—placed one close to the inlet of the spray and the other placed remote from the air inlet, are kept within the limits as per 6.2. The compressed air used during the test shall be free from oil and dirt.

3.3 Details of the construction and function of the spray cabinet have been incorporated in a separate specification 'Recommended construction details of apparatus for spray cabinet useful for various salt spray test' (*under preparation*).

4. TEST SPECIMENS

4.1 Selection — The number and type of test specimens, their shape and dimension shall be selected according to the specification covering the coating or product being tested. When not so specified details concerning the specimens shall be mutually agreed between the purchaser and the supplier.

*Specification for water for general laboratory use (*second revision*).

4.2 Cleaning — The specimens shall be thoroughly cleaned before testing. The method employed shall depend on the nature of the surface (coating) and of the contaminants and shall not include the use of any abrasives or solvents which may attack the coated surface of the specimens.

4.2.1 Metallic and metallic coated specimens shall be cleaned immediately prior to testing by wiping the significant surface with a cotton swab saturated with a slurry containing 10 g of pure magnesium oxide powder in 100 ml of distilled water followed by rinsing in warm running water. Anodized aluminium parts shall be cleaned with inhibited 1, 1, 1-trichloroethene, carrying out the cleaning in a well ventilated area away from open flames. Organic and other non-metallic coated specimens should not be cleaned. Other methods of cleaning, such as the use of nitric acid solution for the chemical cleaning or passivation of stainless steel specimens, are permissible when agreed upon by the purchaser and the supplier

4.2.2 Care shall be taken that the specimens are not re-contaminated after cleaning by excessive or careless handling.

4.3 Protecting Cut Edges — If the test specimens are cut from a larger coated article, the cutting shall be carried out in such a way that the coating is not damaged in the area adjacent to the cut to prevent galvanic effect. Unless otherwise specified, the cut edges shall be adequately protected, by coating them with a suitable medium stable under the conditions of the test, such as paint, wax or adhesive tape. Areas with identification marks may also be protected suitably.

5. METHOD OF EXPOSURE OF TEST SPECIMENS

5.1 Placement — The specimens shall be so placed in the spray-cabinet that they are not in the direct line of travel of spray from the atomizers. Baffles may be used to prevent direct impact of the sprayed solution on the specimens.

5.2 Angle of Exposure — The angle at which the specimen is exposed in the spray-cabinet is very important. The surface shall, in principle, be flat and placed in the cabinet facing upwards at an angle as close as possible to 20° to the vertical. This angle shall, in all cases, be within the limits of 15° to 30°.

5.2.1 Due care shall be taken to see that the significant surface of the specimen is properly exposed to the spray of the test solution, as above.

5.2.2 In case of irregular surfaces, for example entire components, the above limits shall be adhered to as closely as possible.

5.3 Arrangement — The specimens shall be so arranged that they do not come into contact with one another or with the cabinet and that surfaces, to be tested are exposed to free circulation of spray. The specimens may be placed at different levels within the cabinet as long as the solution condensate may not drip from specimens or their supports at one level into other specimens placed below.

5.4 Material for Supports — The supports or racks for the specimens shall be made of inert non-metallic material, such as glass, plastics, rubber or suitably coated wood. If it is necessary to suspend test specimens, the material used shall on no account be metallic and shall be synthetic fibre, cotton thread or other inert insulating material.

5.5 When to Place — The specimens shall be placed in the spray-cabinet just prior to bringing the temperature in the cabinet to the required level and turning on the compressed air, since storage in an idle chamber overnight or for a significant length of time, may affect the test results.

6. OPERATING CONDITIONS

6.1 Temperature — The temperature inside the spray-cabinet shall be $50 \pm 2^\circ\text{C}$ with the minimum possible fluctuation throughout the cabinet during the test.

NOTE — This may be best accomplished by pre-heating the cabinet to 50°C before starting the atomization of the test solution. The air supply shall be heated by passing fine bubbles of air supply through heated distilled or de-ionized water, so that the temperature of air after expansion at the atomizer nozzle is $50 \pm 2^\circ\text{C}$. The test duration shall be computed from the time the temperature reaches 50°C and the fog is present in the cabinet.

6.2 Condensate Values — The solution condensate collected in each of the collecting devices shall have a sodium chloride concentration of 50 ± 10 g/l and the pH value in the range of 3.1 to 3.3 (see 2.3).

6.2.1 The average rate of collection of the solution condensate in each device measured over a minimum period of 24 hours shall be 1.0 to 2.0 ml/h for a horizontal collecting area of 80 cm^2 .

NOTE — Dilution or evaporation of the solution condensate should be avoided. The factors that may contribute to dilution or evaporation of the condensate causing variations in concentrations are:

- a) lower temperature,
- b) inadequate cover insulation, and
- c) prolonged storage of the test solution at above room temperature.

6.3 Test Solution — The test solution which has been sprayed shall not be re-used. Fresh test solution shall be used for every test.

NOTE — In order to compare test conditions from one laboratory to another or from one day to another, a calibration may be made by exposing nickel panels, having dimensions 100×75 mm, to the spray at each of the four bottom corners of the cabinet. The loss of mass of such panels, treated as described in the Appendix A, should be from 35 to 70 mg in a test period of 24 hours.

6.4 Temperature Recording — The temperature within the exposure zone of the closed spray-cabinet shall be recorded at regular intervals (about 3-4 h) during the course of the test by means of a thermometer so placed as to allow reading and recording from outside the closed cabinet during the course of the conducted test.

Preferably a continuous temperature recording device may also be provided. The temperature indicated, when the cabinet is opened for placing specimens, for observations, etc, may be low and as such may not be recorded.

7. DURATION OF TESTS

7.1 Period of Tests — The period of tests shall be as stipulated in Indian Standards covering the coating or product being tested. When not specified, it shall be as mutually agreed to between the purchaser and the supplier.

7.1.1 Recommended periods of exposure are 2, 4, 6, 8, 12, 16, 24, 48, 96, 192, 240, 480, 720 hours.

7.2 The Spraying — The spraying shall be continuous and uninterrupted during the prescribed test period unless otherwise specified or agreed. The cabinet shall be opened only for brief visual inspections of the test specimens in position, re-arrange, and for checking replenishing the test solution in the reservoir if such replenishment cannot be carried out from outside the closed cabinet.

7.3 Inspection — If the end point of the test depends on the appearance of the first sign of corrosion, the specimens may need to be inspected frequently. For this reason such specimens shall not be tested together with other specimens requiring tests of pre-determined duration.

7.4 Visual Examination — A periodic visual examination of specimens under test for a pre-determined period may be made but the surfaces under test shall not be necessary to observe and record any visible changes.

8. CLEANING OF SPECIMENS AFTER TEST

8.1 At the end of the test period, remove the specimens from the spray cabinet. Allow the specimens to dry for half an hour, gently rinse in water

to remove any residual chemical. Before they are examined, carefully remove residues of the sprayed solution from their surfaces. A suitable method is to rinse or dip the specimens gently in clean running water at a temperature not exceeding 40°C and then to dry them immediately in a stream of compressed air at a pressure not exceeding 200 kPa at a distance of approximately 300 mm.

9. EVALUATION OF RESULTS

9.1 Many different criteria for the evaluation of the results of this test may be applied to meet particular requirements, for example, change in mass, alterations revealed by micrographic examination, change in mechanical properties, etc. Usually the appropriate criteria will be indicated in the specification for the coating or product tested. For most routine applications of the test, only the following need to be considered:

- a) Appearance after test;
- b) Appearance after removing superficial corrosion products;
- c) The number and pattern of distribution of corrosion spots/defects, that is pits, cracks, blisters, etc; these may be conveniently assessed by methods, such as that described in IS : 6009-1970*; and
- d) The time elapsing before the appearance of the first sign of corrosion.

10. TEST REPORT

10.1 The test report shall indicate the outcome of the test according to the criteria for evaluation of results prescribed for the test. The results obtained for each of the specimens tested, and, when appropriate, the average results for a group of replicate test specimens, shall be reported. The report may, if required, be accompanied by photographic records of the tested specimens.

10.2 The test report shall contain information about the test procedure. This information may vary according to the purposes of the test as and the directions prescribed therein, but a general list of the details likely to be required is as follows:

- a) The description of the coating or product tested;
- b) Dimensions, shape and other details of the test specimen and the nature and area of the surface tested;

*Method for evaluation of results of accelerated corrosion tests.

- c) Preparation of the test specimen including any cleaning treatment applied or any protection given to the edges, cut edges or other special areas;
- d) Known characteristics of any coating, with a indication of the surface finish;
- e) The number of test specimens subjected to the test, representing each coating or product;
- f) The method used to clean the test specimen after test with, when appropriate, an indication of the loss in mass resulting from the cleaning operation;
- g) The angle at which the tested surfaces were inclined;
- h) The test temperature maintained, with fluctuations observed, if any;
- j) The duration of the test conducted;
- k) The properties of any test panels placed in the cabinet to check the correctness of the operating conditions and the results obtained with them;
- m) Grade and purity of sodium chloride, distilled water, cupric chloride and acetic used for preparing the test-solution;
- n) The solution condensate collected in the collecting devices — in terms of ml/h, 80 cm² and its pH;
- p) Method and materials employed for supporting/suspending placing the specimens in the spray-cabinet; and
- q) Interruptions in the test conducted, if any, their causes and durations.

APPENDIX A

(Clause 6.3)

STANDARDIZATION OF TEST CONDITIONS

A-1. GENERAL

A-1.1 This Appendix describes the method for evaluating the corrosive effect of the conditions produced in the spray test cabinet. The results obtained permit a comparison to be made of the test conditions obtained in different laboratories or in the same laboratory at different times.

A-2. TEST PANELS

A-2.1 The test panels shall be cut from commercially pure nickel sheet containing not less than 99.0 percent nickel and not more than 0.15 percent carbon, 0.01 percent sulphur, 0.4 percent iron and 0.25 percent copper. A suitable sheet thickness is approximately 1 mm and the panel dimensions shall be 100 × 75 mm.

Panels to be used for the first time shall be cleaned by the general procedure specified in 4.2 and shall then be immersed for 2 minutes at a temperature of 21 to 24°C in a solution prepared by mixing 1 volume of concentrated hydrochloric acid with 4 volumes of distilled water, rinsed in warm flowing water and dried in an oven at a temperature of 105°C, cooled to room temperature and weighed. Panels used in the test may be re-used. The procedure for removing corrosion products at the end of a test will produce a satisfactory surface for a subsequent test.

A-3. ARRANGEMENT OF PANELS

A-3.1 The weighed panels shall be placed in the test cabinet with the longer edges inclined at 30° to the vertical with the upper surface facing the general direction of the incoming spray. Supports for the panels shall be made of or completely covered by inert materials, such as plastics. The upper edges of the panels shall be at the same level as the tops of the spray collectors.

A-4. DETERMINATION OF MASS LOSS

A-4.1 After exposure to test for 24 h the panels shall be rinsed in cold water to remove spray residues. The corrosion products shall then be removed from each panel by immersing it for 2 minutes at a temperature of 21 to 24°C in a solution prepared by mixing one volume of concentrated hydrochloric acid with 4 volumes of distilled water. Tongs used to hold the panels shall be of nickel or Monel metal or shall have their contact areas covered with inert material. Each panel shall then be washed in water with a final rinse in flowing water at a temperature of approximately 40°C, dried in an oven at a temperature of 105°C, cooled to room temperature and again weighed.

APPENDIX B

(Clause 0.2.2)

SPECIFIED TESTS, EXPOSURE DURATION AND EVALUATION OF CORROSION RESISTANCE TESTS STIPULATED IN IS SPECIFICATIONS

SPECI- FICATION	COATING	BASE	SERVICE GRADE No.	CLASSIFICATION No.	CORROSION TEST DURATION (HOURS)				EVALUATION	REMARKS
					CASS IS : 5528- 1985	ASS IS : 6910- 1985	NSS IS : 9844- 1981	CORR IS : 8038- 1985		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
IS : 1068- 1985	Cu + Ni + Cr	Fe & steel	4	Fe/Cr20Ni30b Cr mc/mp	24	144	—	2 × 16	Minimum rating of 8 as per IS : 6009 for acceptance	
				Fe/Cu20Ni30p Cr r						
				Fe/Cu20Ni25p Cr mc/mp						
				Fe/Cu20Ni30d Cr r						
				Fe/Cu20Ni25d Cr mc/mp						
	Ni + Cr	do	4	Fe/Ni40p Cr r						
				Fe/Ni30p Cr mc/mp						
				Fe/Ni40d Cr r						
				Fe/Ni30d Cr mc/mp						
	Cu + Ni + Cr	do	3	Fe/Cu20Ni35b Cr r	16	96	—	16		
				Fe/Cu20Ni25b Cr mc/mp						
				Fe/Cu15Ni25p Cr r						
				Fe/Cu15Ni20p Cr mc/mp						
				Fe/Cu15Ni25d Cr r						
	Ni + Cr	do	3	Fe/Cu15Ni20d Cr mc/mp						
				Fe/Ni40b Cr r						
				Fe/Ni30b Cr mc/mp						
				Fe/Ni30p Cr r						
				Fe/Ni25p Cr mc/mp						
				Fe/Ni30d Cr r						
				Fe/Ni25d Cr mc/mp						

(Continued)

IS : 5528 - 1985

**SPECIFIED TESTS, EXPOSURE DURATION AND EVALUATION OF CORROSION
RESISTANCE TESTS STIPULATED IN IS SPECIFICATIONS—Contd**

IS : 5528 - 1985

SPECI- FICATION	COATING	BASE	SERVICE GRADE No.	CLASSIFICATION No.	CORROSION TEST DURATION (HOURS)				EVALUATION	REMARKS
					CASS IS : 5528- 1985	ASS IS : 6910- 1985	NSS IS : 9844- 1981	CORR IS : 8038- 1985		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
14	IS : 4828- 1983	Cr+Ni+Cr Ni+Cr	do	2	Fe/Cu20Ni10b Cr r	4	24	—	4	@Not suitable
			do	2	Fe/Ni20b Cr r					
		Cu+Ni+Cr Ni+Cr	do	1	Fe/Cu10Ni5b Cr r	@	8	—	@	
			do	1	Fe/Ni10b Cr r					
		Cu+Ni+Cr	Zn & Zn-alloys	4	Zn/Cu20Ni35b Cr mc/mp	24	144	—	2×18	Minimum rating of 8 as per IS : 6009-1970 for accep- tance
					Zn/Cu20Ni35p Cr r					
					Zn/Cu20Ni25p Cr mc/mp					
					Zn/Cu20Ni35d Cr r					
					Zn/Cu20Ni25d Cr mc/mp					
				3	Zn/Cu20Ni35b Cr r	16	96	—	16	
					Zn/Cu20Ni25b Cr mc/mp					
					Zn/Cu20Ni25p Cr r					
					Zn/Cu20Ni20p Cr mc/mp					
					Zn/Cu20Ni25d Cr r					
					Zn/Cu20Ni20d Cr mc/mp					
				2	Zn/Cu Ni15b Cr r	4	24	—	4	Undercoat of Cu or brass, Min 8 µm
				1	Zn/Cu Ni8b Cr r	—	8	—	—	

IS : 4942-1983	Ni+Cr	Al & Al alloys	4	Al/Ni50d Cr r Al/Ni35d Cr mc/mp	24	144	—	2×16	Minimum rating of 8 as per IS : 6009-1970 for acceptance	Cu undercoat desirable for some alloys; but with no reduction of Ni-layer
			3	Al/Ni35p Cr r Al/Ni30p Cr mc/mp Al/Ni30d Cr r Al/Ni25d Cr mc/mp	16	96	—	16	do	
			2	Al/Ni20b Cr r	4	24	—	4	do	
			1	Al/Ni10b Cr r	—	8	—	—	do	
		Plastics	4	More than service condition No. 3 (to be agreed mutually)	16	96	—	—	Minimum rating of 8 as per IS : 6009-1970 for acceptance	Thickness and type as agreed Cu undercoat 15 µm Min if required
			3	PL/Ni15 Cr	8	48	—	—		
			2	PL/Ni8 Cr	—	16	—	—		
			1	PL/Ni5 Cr	—	—	—	—		
		Cu & Cu alloys	4	Cu/Ni30b Cr mc/mp Cu/Ni30p Cr r Cu/Ni25p Cr mc/mp Cu/Ni30d Cr r Cu/Ni25d Cr mc/mp	16	96	—	—	Minimum rating of 8 as per IS : 6009-1970 for acceptance	Less than 24 h as agreed
			3	Cu/Ni25b Cr r	—	24	—	—		
			2	Cu/Ni20d Cr mc/mp	—	8	—	—		
			1	Cu/Ni5b Cr r	—	—	—	—		

Less than 24 h as agreed

(Continued)

IS : 5528 - 1985

SPECIFICATION	COATING	BASE	SERVICE GRADE No.	CLASSIFICATION No.	CORROSION TEST DURATION (HOURS)				EVALUATION	REMARKS
					CASS IS : 5528- 1985	ASS IS : 6910- 1985	NSS IS : 9844- 1981	CORR IS : 8038- 1985		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
IS : 1868-1982	Anodic coating	Aluminium & aluminium alloy	Ac 25 Ac 15 Ac 10 Ac 5 Ac 2.5		— —	— — — — —	— — — — —	— — — — —	No. of pits more than 1/6th of area in cm ² — cause for rejection	As agreed
IS : 6651-1972	Anodic coating for auto-mobile use	Aluminium	Ac 10 Ac 5 Ac 2.5		12 8 —	— — 24	— — —	— — —	Any significant sign of corrosion— cause for rejection	
		b	Bright nickel							
		p	Semi-bright nickel							
		d	Double or triple layer nickel							
		r	Regular chromium 0.3 mm, Min							
		mc	Micro-crack chromium 0.3 m, Min							
		mp	Micro-porous chromium 0.3 m, Min							



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